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APPLICATION NUMBER: *60/385,607*
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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No.

INVENTOR(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
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☐ *Additional inventors are being named on the ______ separately numbered sheets attached hereto*

TITLE OF THE INVENTION (500 characters max)

A DEVICE AND METHOD FOR THE PRODUCTION OF CELLULAR CUSHIONED MATERIAL

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ENCLOSED APPLICATION PARTS ***(check all that apply)***

- ☒ Specification *Number of Pages* 5
- ☒ Drawing(s) *Number of Sheets* 12
- ☐ Application Data Sheet. See 37 CFR 1.76
- ☐ CD(s), Number
- ☐ Other (specify)

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

- ☒ Applicant claims small entity status. See 37 CFR 1.27.
- ☐ A check or money order is enclosed to cover the filing fees
- ☐ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number:
- ☒ Payment by credit card. Form PTO-2038 is attached.

FILING FEE AMOUNT ($): 80

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- ☒ No.
- ☐ Yes, the name of the U.S. Government agency and the Government contract number are: ______

Respectfully submitted,

SIGNATURE [signature]

Date June 3, 2002

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REGISTRATION NO. *(if appropriate)*

TELEPHONE ++ 972-9-8854565

Docket Number:

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

A Solution for conveying and feeding of raw materials for an end-user's on-site air-bubble-wrap manufacturing unit. Description of the problem:

The manufacturing of cellular cushioning from semi-flexible plastic sheets, can result in the formation of creases in the areas of welding. Serious welding problems are incurred since welding takes place upon an inflated form and while two layers are welded at some points, simultaneously, many layers are welded at other points. This creates non-uniform welds along the sheet. Applying more heat or a longer welding time will have a more detrimental effect on the double-layered sections. On the other hand applying less heat during welding or welding for a shorter time interval will result in poorer welding properties in the multi-layered areas.

An additional difficulty is aroused in the manufacturing of sheets of bubble wrap, where many bubbles are arranged in a row and can therefore cause an accumulation of folds. An additional problem occurring in the manufacturing of sheets is the general horizontal shrinkage of the sheets. The sheet emerges from the feed flat and filled with air prior to welding. This creates a sheet of trapezoidal shape. The final welding even worsens the warping and the final product received is askew, deformed and unaesthetic and therefore difficult to use as illustrated in Figure 1 (inflated) and figure 5 (prior to inflation).

The solution

1. The solution is achieved by the flattening of the raw material at the inflating area.
2. Among the means for flattening are the following:

The apparatus needs to permit minimal inflation into the entire inflated area except for the last row of the cells being blocked off and welded. The distance between the sides of the sheet needs to be minimal, albeit sufficient to permit the compressed air to reach the last row of cells, a distance of a few millimeters. An inflated sheet essentially cannot revert to its flattened width and the formation of folds or creases along the line of welding is unavoidable. Therefore the sheet should be limited to being inflated only to the area that the air must be pushed.

The Proposed Mechanism:

1. The simplest method of implementing this solution is by having two and constraining plates that do not permit inflation of the sheet. The disadvantage of this method is the tremendous amount of friction that the inflated sheet endures against the plates and the difficulty in advancing this sheet. The advantage is in its simplicity. See Figure 2.
2. A system which allows the frictionless advancement of the sheet. The disadvantage of this is that the inflation of the sheet between the rollers or wheels still causes great friction. The advantage is that it isinexpensive. See Figure 3.
3. A motorized roller conveying system. As in 2 above but with motorized rollers or wheels that advance the sheet . The disadvantage is the relatively great amount of friction needed to overcome and the relatively high price of the apparatus.
4. A conveyor belt system on either side of the sheet. The conveyor belts will advance the material while limiting inflation of the raw material as it is advanced, keeping it flat and un-deformed. See figure 4.
5. Any combination of the above.

Pre-welding of plastic sheets for manufacturing cellular cushioning material for end-user on-site application.

General Description:

Cellular cushioning material is used for packaging and void filling. Today they are mostly manufactured in plastics factories using specially designated, expensive machines. Following their manufacture, they are filled with air and are ready for use. The disadvantage of this conventional product is the necessity to transport essentially a voluminous almost weightless amount of air from one location to another. This is an expensive transport operation and becomes more so as the distance between the end-user and the manufacturing facility increases. On top of that one has to add expensive storage space needed to stock the large volumes of materials..

In patent application number 09/758,544 entitled 'Cellular Cushioning Material and a Method for its Production', filed on 01/12/2001, to Hasdi Matarasso a method is taught whereby the final volume is only reached at the end-user's site on an as-needed, real-time basis.

This method avoids the logistic problem of transporting large volumes of air, resulting in a significantly lower unit price for cellular cushioning material. The method necessitates the use of dedicated equipment, apparatus or a device for the inflation and sealing of air-bubble sheets at the end user's premises.

In order for this to be an economically sound method, it is not feasible to have an expensive and intricate apparatus at every end user's site. The apparatus needs to be simple and inexpensive. In order to reduce the price of these machines it is necessary to reduce the number of functions to an absolute minimum. This is a achieved by maximizing preparation of the material at the sheet- manufacturer's site before it is transported to the end user where it is to be inflated.

In patent application number 09/758,544 patent a method is taught of diagonal pre-welding configuration for solving the above mentioned problems.

The new proposal:

Proposing additional and improved methods of pre-welding the plastic material at the sheet-manufacturing site.

1. A method for short longitudinal pre-welding.

The proposed sheet is made from a plastic sleeve or from two plastic layers integrally joined or welded on their sides for their entire length. Between these welded sides throughout the entire area of the sheet, there are rows of welded sections at the desired width and length of the cells. See figure 1A.

The following welded row will be moved over to the side such that there will be no overlapping between rows, thus forming a "brick layering" pattern. The ideal distance between weldings is approximately half of the distance between each cell. See figure 1A.

This "brick layering" configuration allows the flow of air between the weldings from the point of inflation along the entire width of the sheet. See Figures 3A/B. The sheet will inflate horizontally all across its width. The horizontal welding is welded across all of the pre-weldings below it and as the horizontal welding crosses the non-horizontal pre-weldings, air filled cells will be sealed. In the next stage the sheet is advanced for the precise length needed in order to form the next row of cells while simultaneously being inflated, which is followed by a new horizontal welding and so on and so forth.

In order to ensure proper sealing and precision it is suggested to move the rows of the pre-welded sheets towards each other thus creating an overlap over the pre-welded seals. See Figure 2A/B.Figure 2c is a cross sectional view of fig 2a and 2b By using this method it is possible to add perforations between the pre-welded rows. The welding heating element will weld on either side of the perforations, thus ensuring the proper sealing of the cells.
This will facilitate a more convenient use of the pre-welded sheet in addition to providing a convenient way of tearing the sheet at the desired length. Fig 1A/B/Fig1c is a cross sectional view of fig 1a and 1b
The advantages of this method:

1. A more convenient use of the sheets.
2. A simpler process for pre-welding.
3. Permits horizontal perforations.
4. Prevents or at least minimizes formation of uninflated areas.

The disadvantages of this system:
Demands greater precision in both the manufacturing facility of the pre-welded sheets and in the final welding on the end-user's on-site machine A continuous non-precise weld will result in multiple uniflated rows of cells.

A method for improved short longitudinal pre-welding

The proposed pre-welded sheet is similar to the previously suggested method. Yet it is essentially distinguished by introducing a cross pre-welding phase every other row rather than consecutively at every row. See figure 4A.
The on-site end-user machine will advance the sheet an interval of two rows of cushions on each advancing step. The two rows will then be inflated and sealed in between them to create two sealed rows of cells. See figure 4B.

Advantages of this method:

1. Faster advancement of the material which in turn dictates a faster on-site end-user machine.
2. The proposed pre-welding allows the preparation of a fine perforation line for easy tear-off between every two rows, thus introducing the possibility to tear-off the sheet at any desired length.
3. The inflated area is relatively small eliminating the need for specialized flattening devices.

To solve the alignment problem while the material is fed into the end-user machine, it is suggested to manufacture tractor-feeding holes similar to those appearing in paper that is fed into dot-matrix printers.
Another advantage of the tractor-feeding method is the ability to control the shrinkage measure of the sheet at its width. The material is firmly held at both ends thus minimizing the possibility of shrinkage. See figure 4H.

The method of longitudinal welding.
The proposed method suggests to pre-weld the sheet all along the perimeter of the sheet such that it will be sealed from its outer edges and to apply shorter weldings along the width of the sheet. The shorter weldings are the length of a series of

cells, each 20-30 centimeters long with breaks of about 1 centimeter between them. See figure 4I
These breaks create channels through which air flows through the entire width of the sheet. A horizontal welding will simply seal off all of the cells.
The advantages of the system:

1. Precision is necessary only at the area of the inflation point.
2. Relatively simple and easily executable pre-welding.
3. Perforations can be made at the end of each section.
4. There are no problems with unsealed cells in the area of the air blower tube.

The disadvantages are:

1. The areas of the entry nearest to the horizontal air inflation will be airless.
2. The welding in the area of inflation has to be precise otherwise two rows and the gap between them will be airless and will therefore be non-usable which will result in non-continuous sheets.

An improved method of cellular cushioned material production.

The proposed method includes:
1. An improvement in the pre-welding of the sheets.
2. An improvement in the welding of the end-user's on-site machine.

Description of the problem:
By using the method described in patent application 09/758,544 entire areas juxtaposed to the inflation area are not sealed from all directions and are thus un-inflated. This results in significant reduction in the efficiency of the sheet. See figure H1.

The proposed method includes:
1. Improving the pre-welding stage by minimizing the areas not sealed.
2. Altering the shape of the welding on the end-user's on-site machine such that the sheet will be sealed from all of its sides.

Improved pre-welding:
An additional weld is added to the entire length of the air-tube entry line. The welding is applied only in certain discontinuous sections. The diagonal pre-weldings do not reach the sectional welding except for the single longitudinal welding, that joins the beginning of the welded section (at its highest point). See Figure 2. In the shape of the welding the air enters through the internal channel that is formed, such that there are no remaining unsealed areas with the exception of the small section through which the air enters for the length of the proposed welding. Fig H2

Improved welding of the end-user's on-site machine:
In the method described in patent application 09/758,544 a horizontal welding and sealing across the width of the sheet is performed. The proposed method hereby suggests to change the welding configuration by adding a short weld across the air-inlet pipe thus sealing the area of the air-inflation point as well. The length of the weld should be equal to the advancing distance of the plastic sheet such as to form an overlapping seal along the entire length of the sheet.

Advantages and disadvantages:
This improved pre-welding makes the on-site machine much less intricate by necessitating only one longitudinal welding.
However by using this method there remains a small unsealed area. This will also necessitate having a larger on-site machine.

Improvements in the end-users machine:
By using this method there are no unsealed areas remaining.
The heat-sealing element is intricate and hence more expensive, which in turn dictates an increase price for the end-user's machine. Fig H3

Claim:

A device and method for the production of cellular cushioned material substantially as described in the specification.

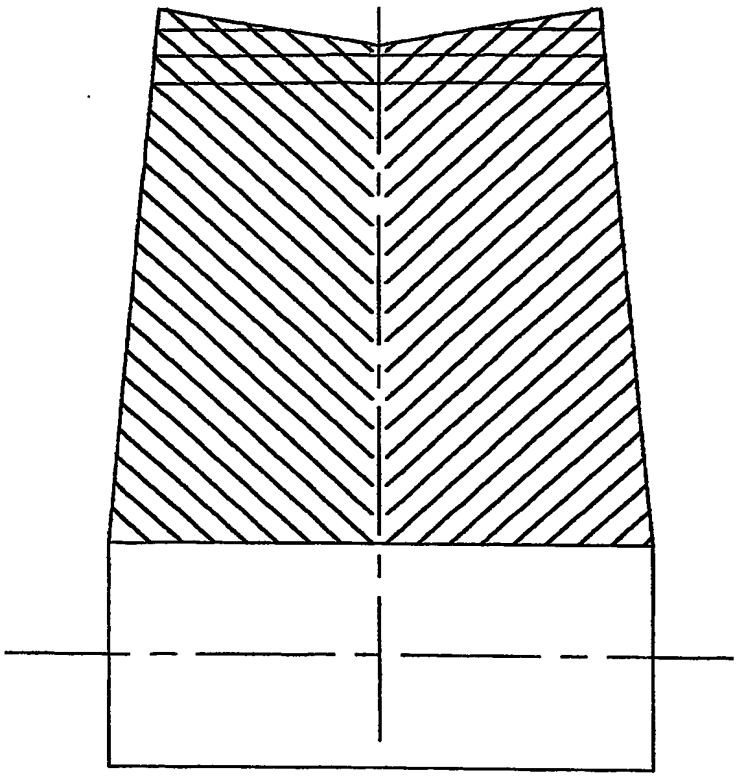


FIG 1

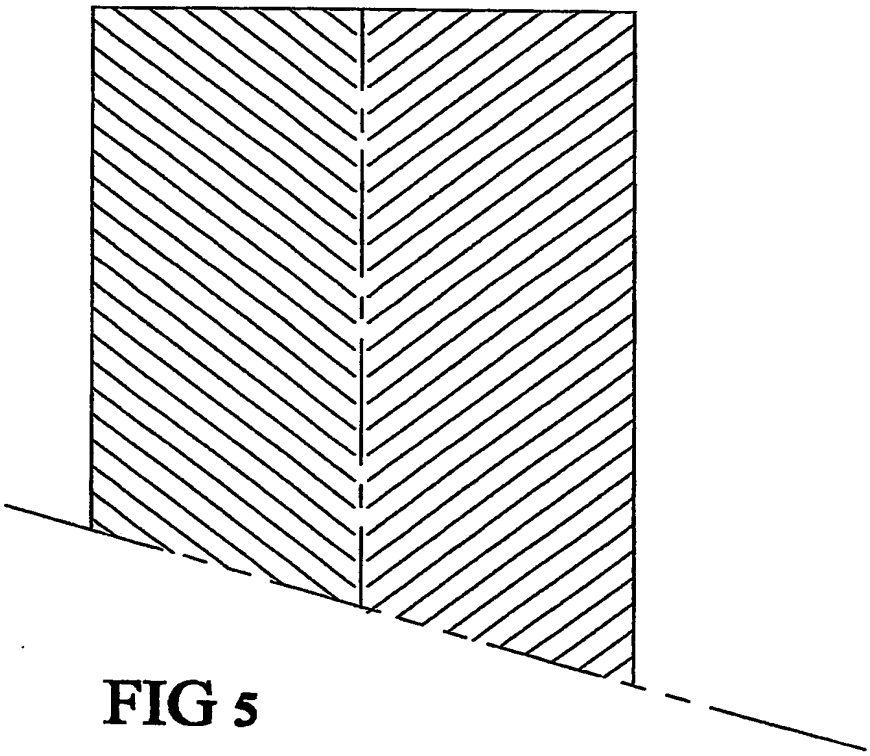


FIG 5

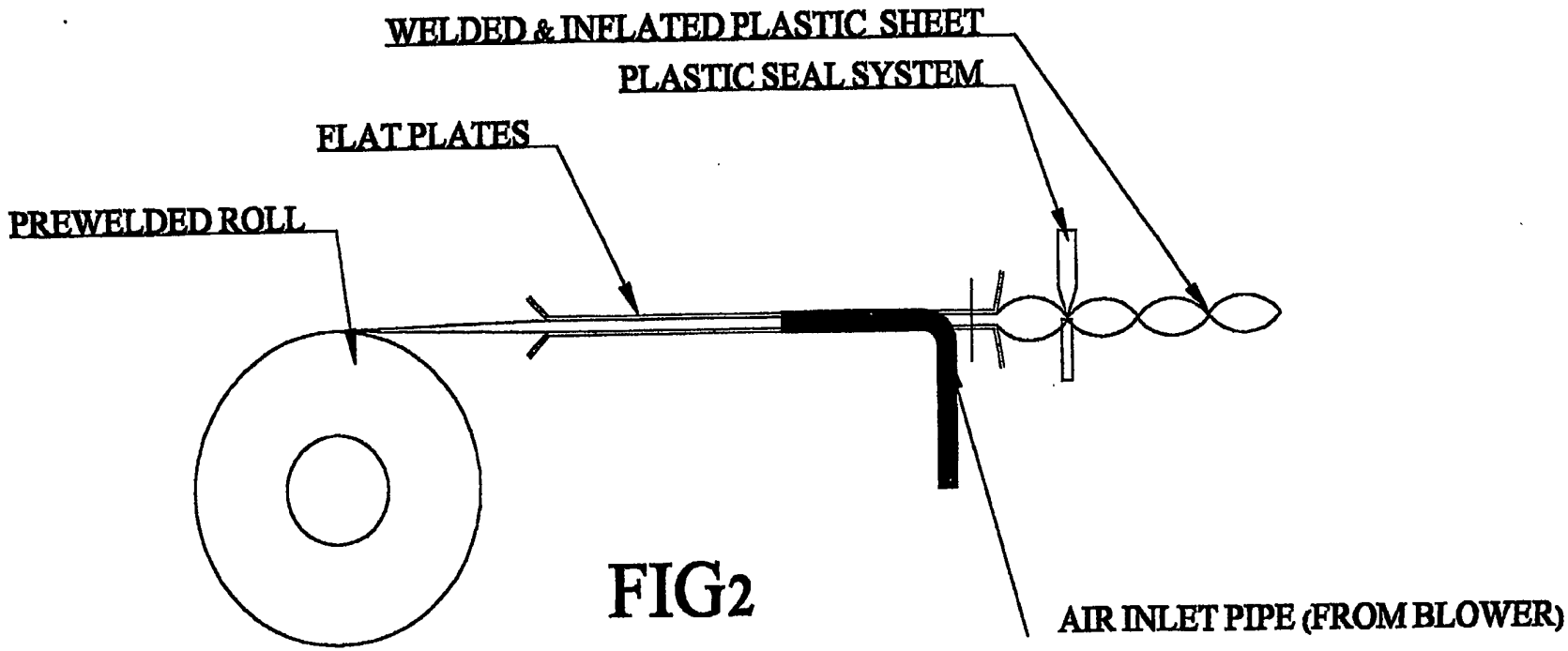


FIG2

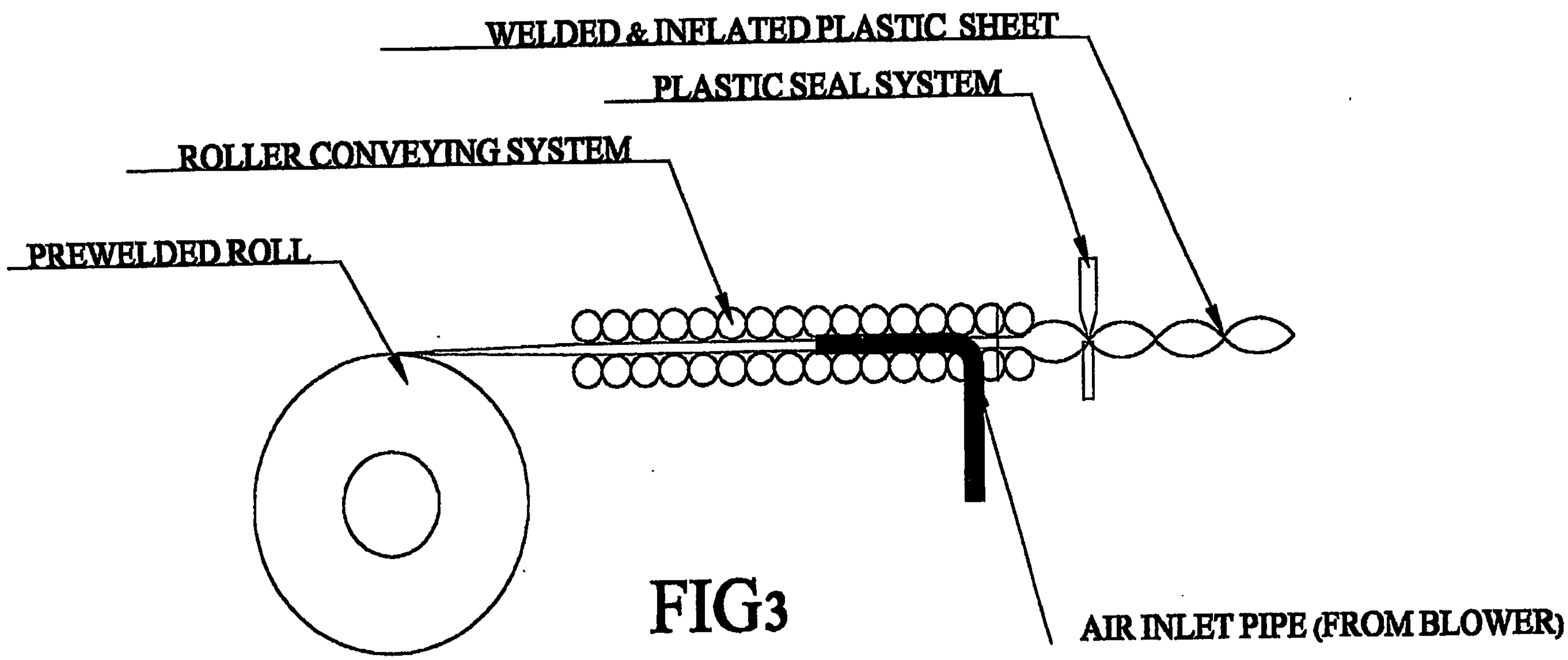


FIG3

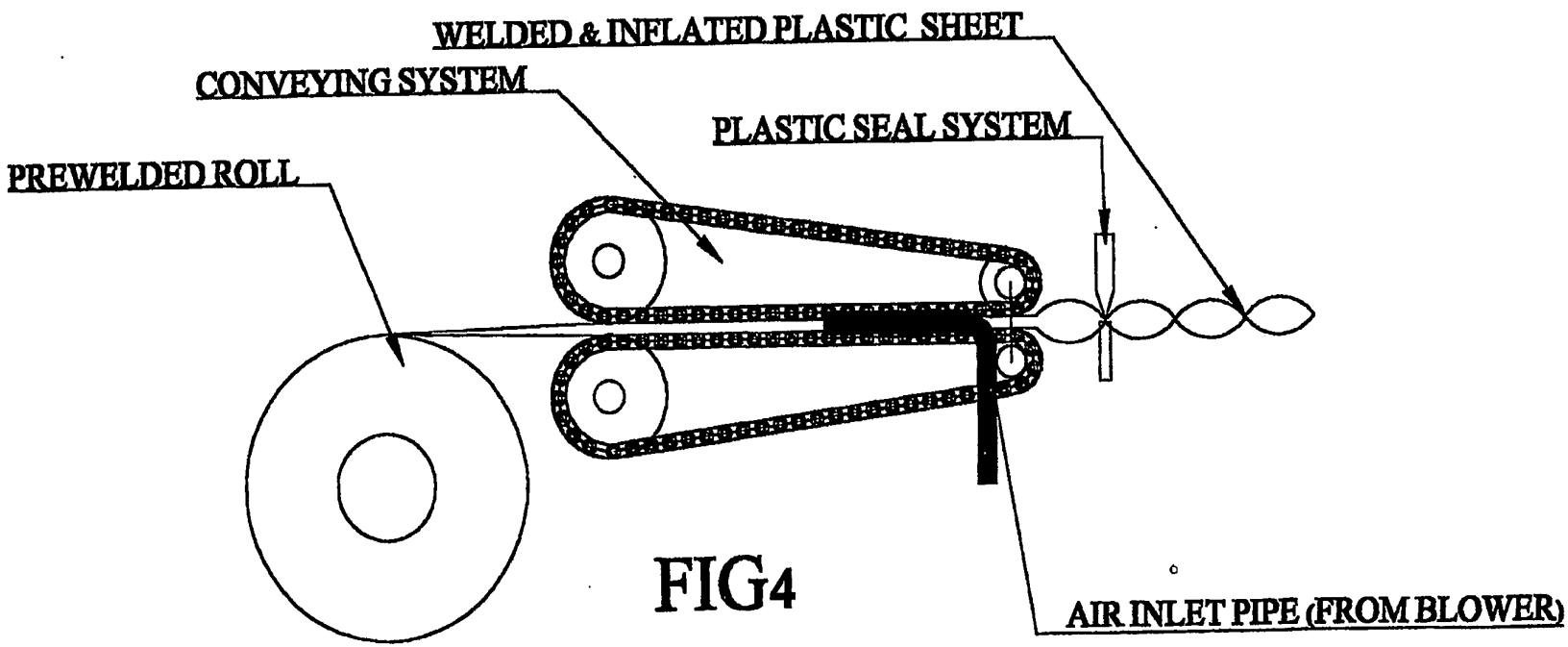


FIG4

FIG. 1A

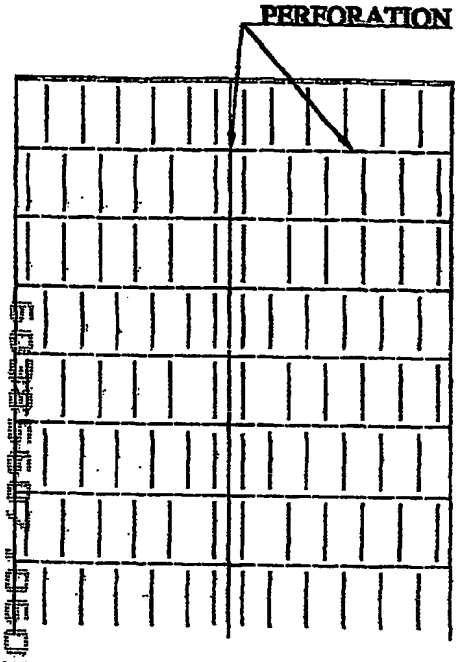


FIG. 1B

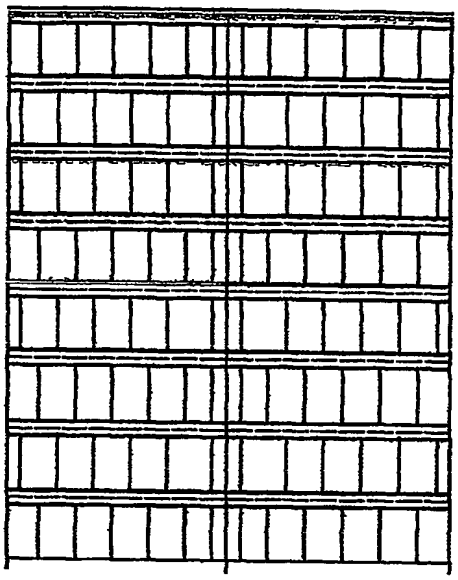


FIG.1 C

FIG. 2A

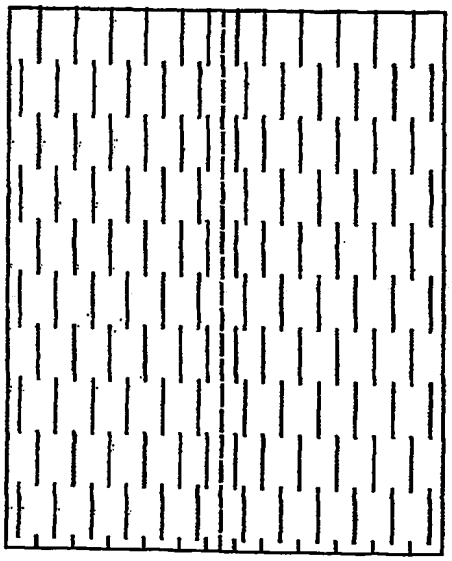


FIG. 2B

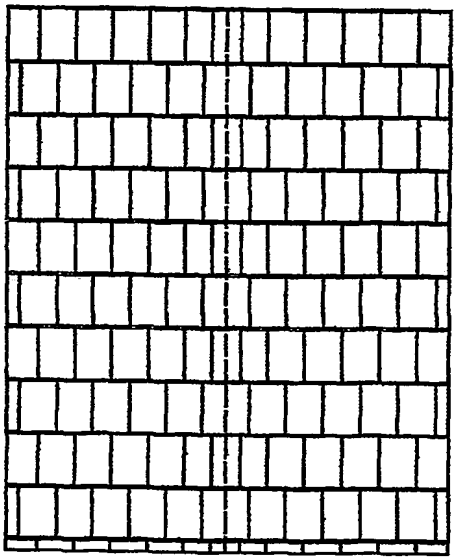


FIG.2 C

FIG. 3A

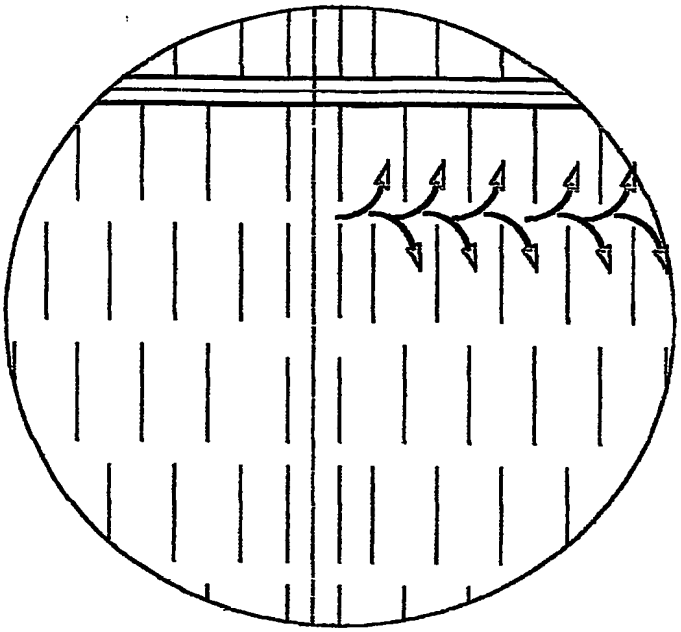


FIG. 3B

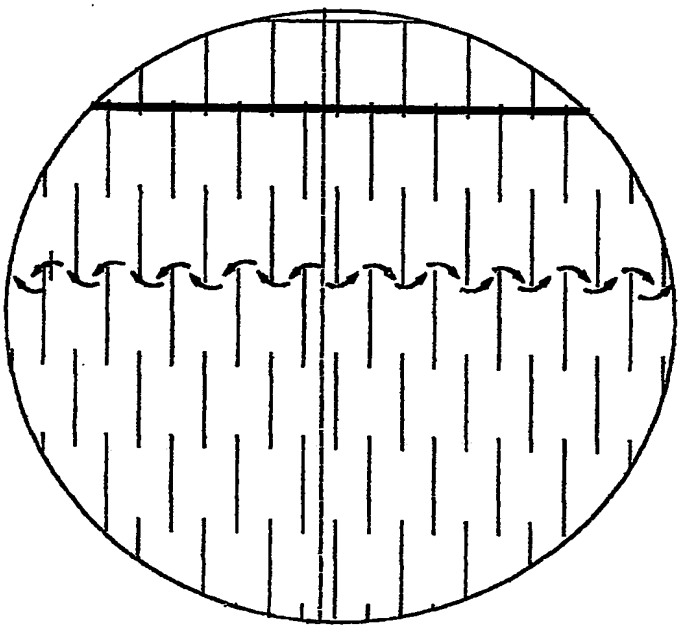


FIG. 4A

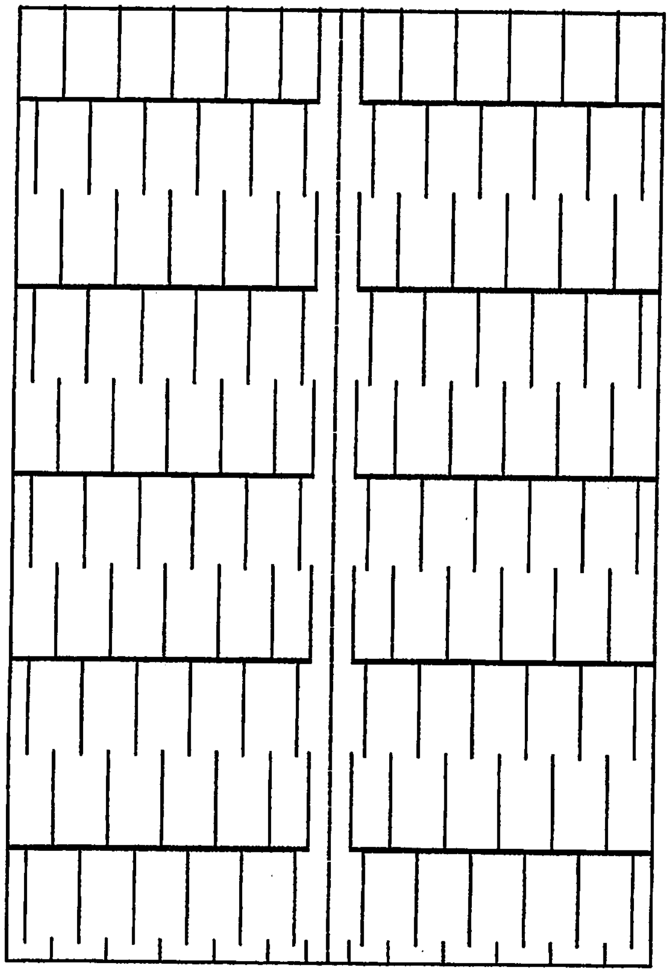


FIG. 4B

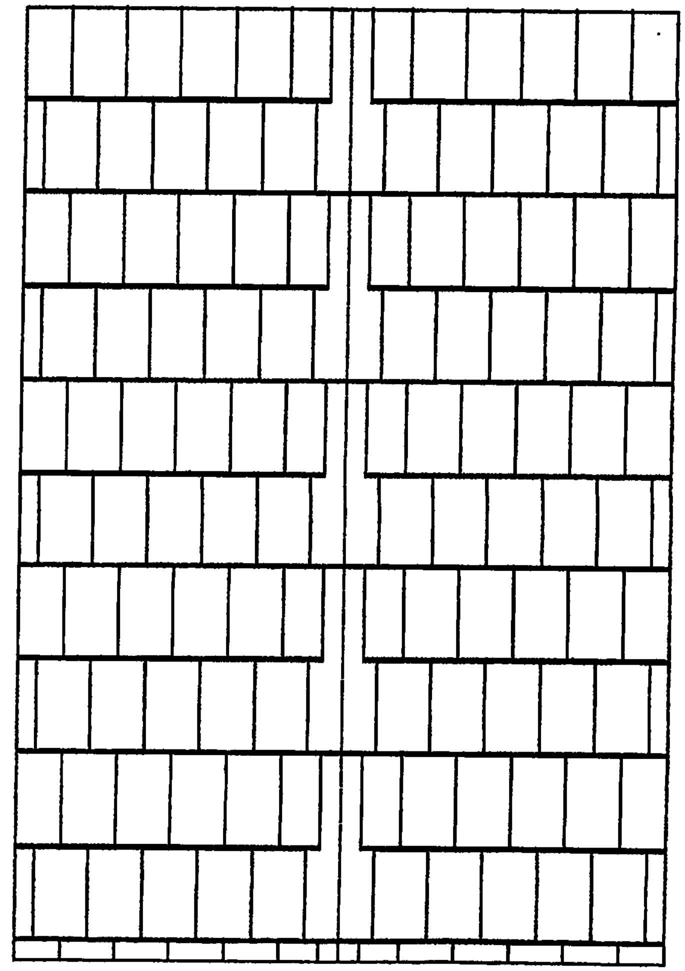
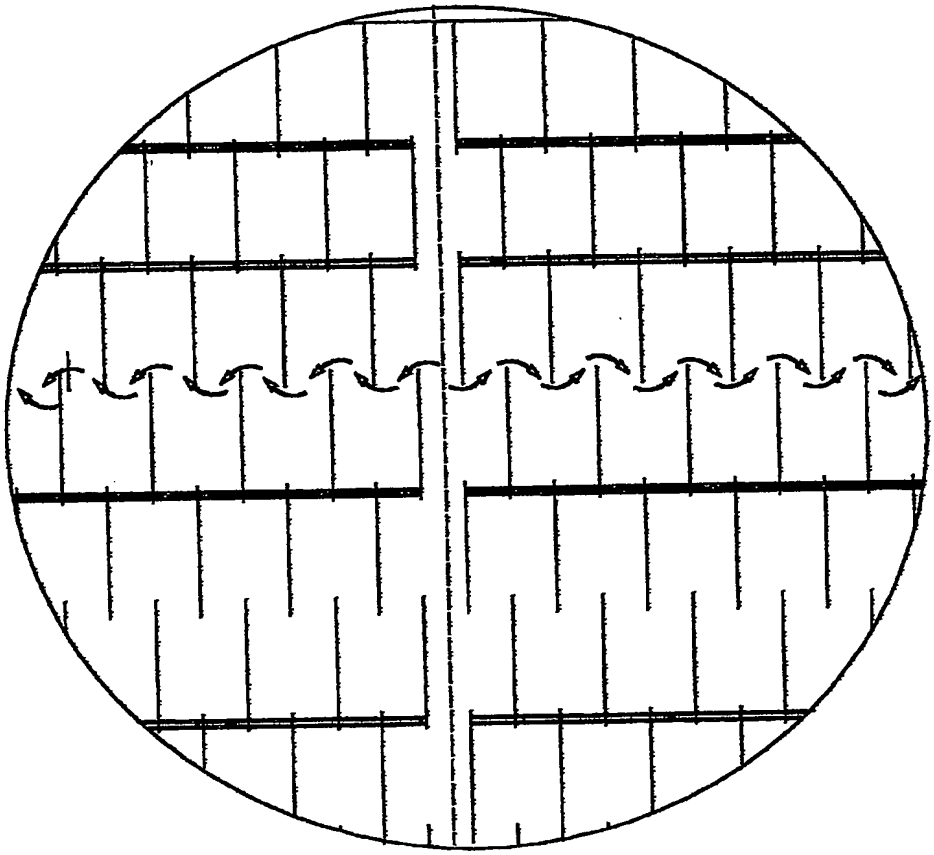


FIG. 4C



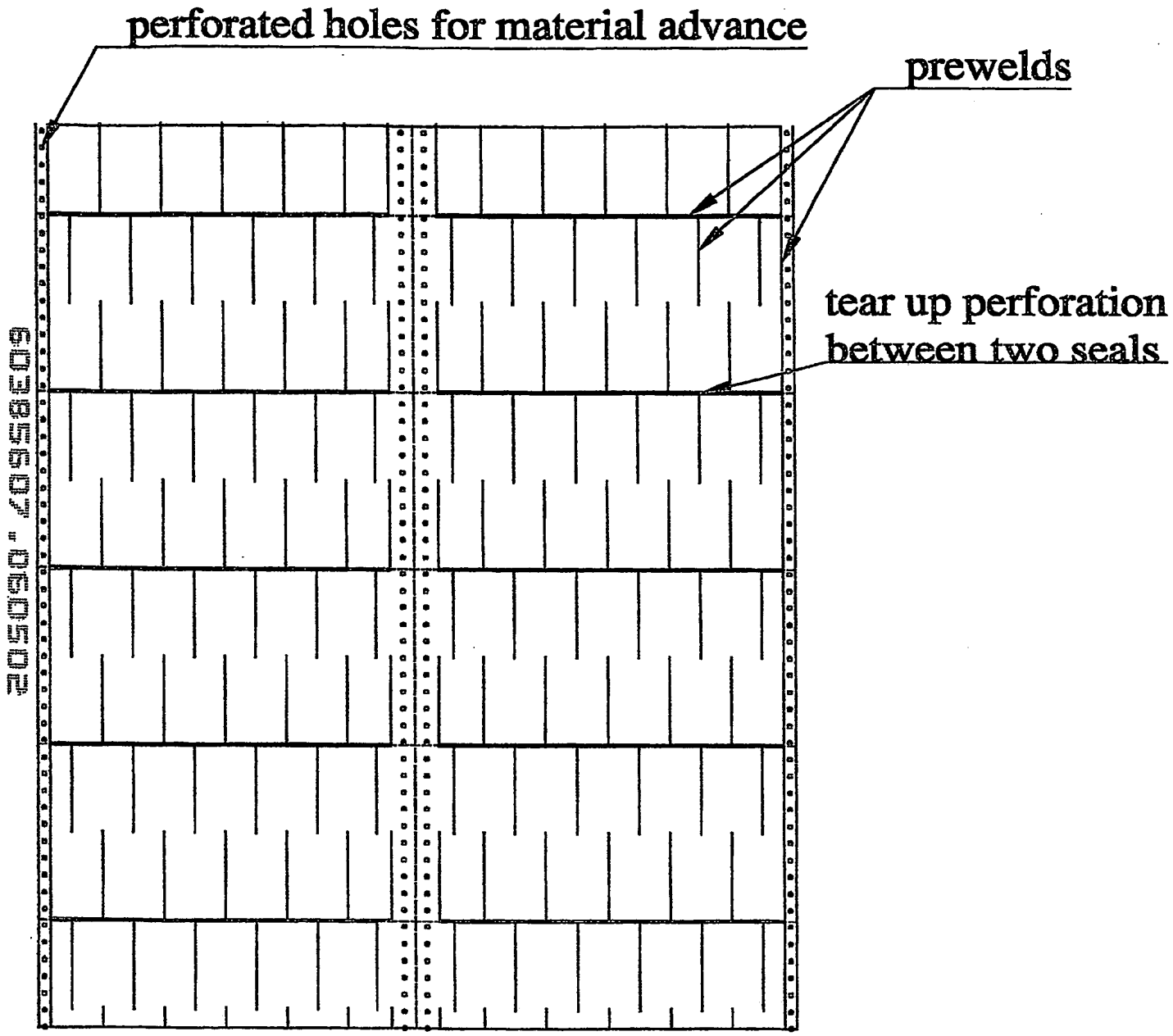
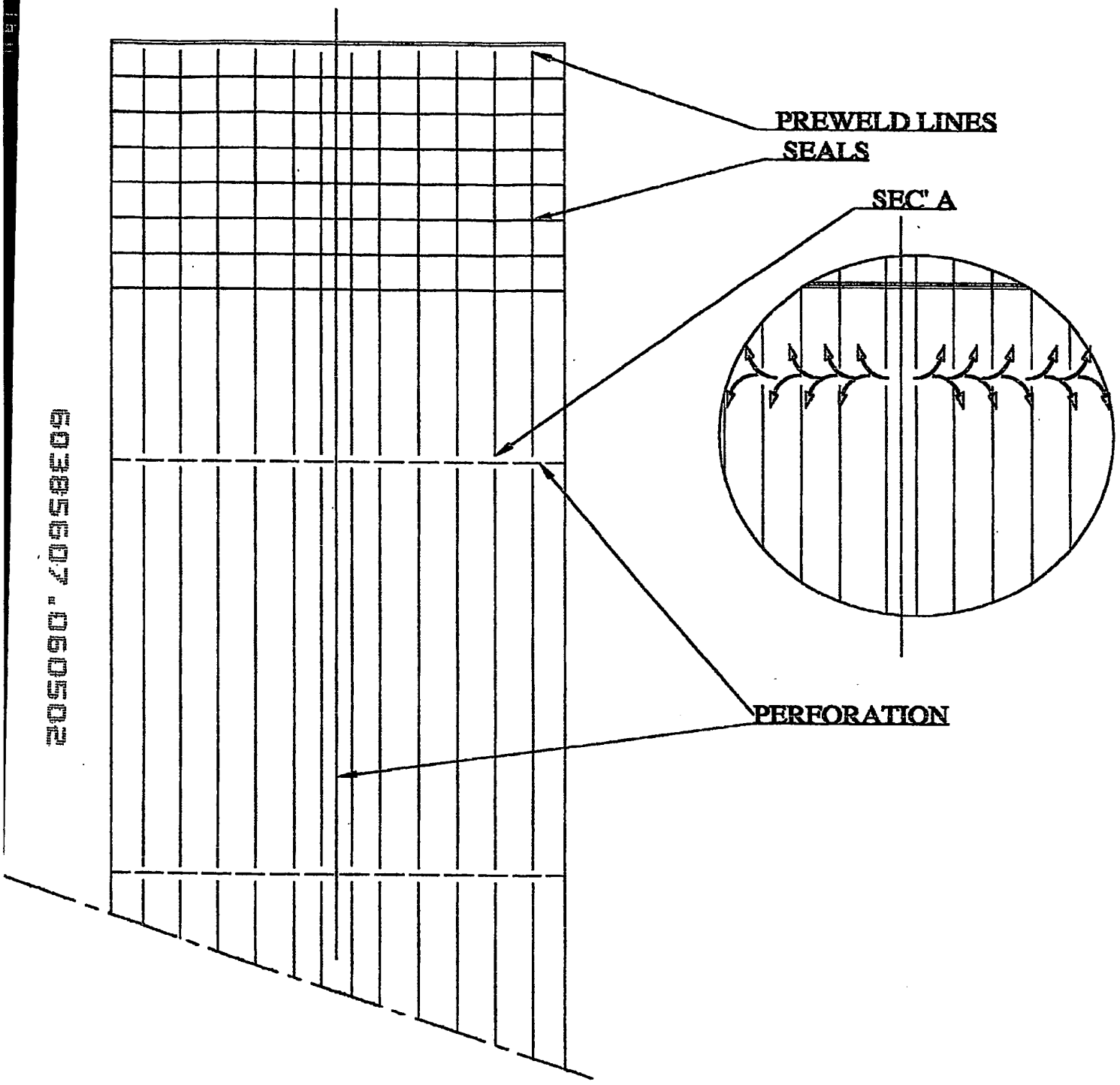

perforated holes for material advance
prewelds
tear up perforation between two seals
20050905.0958209

FIG. 4H



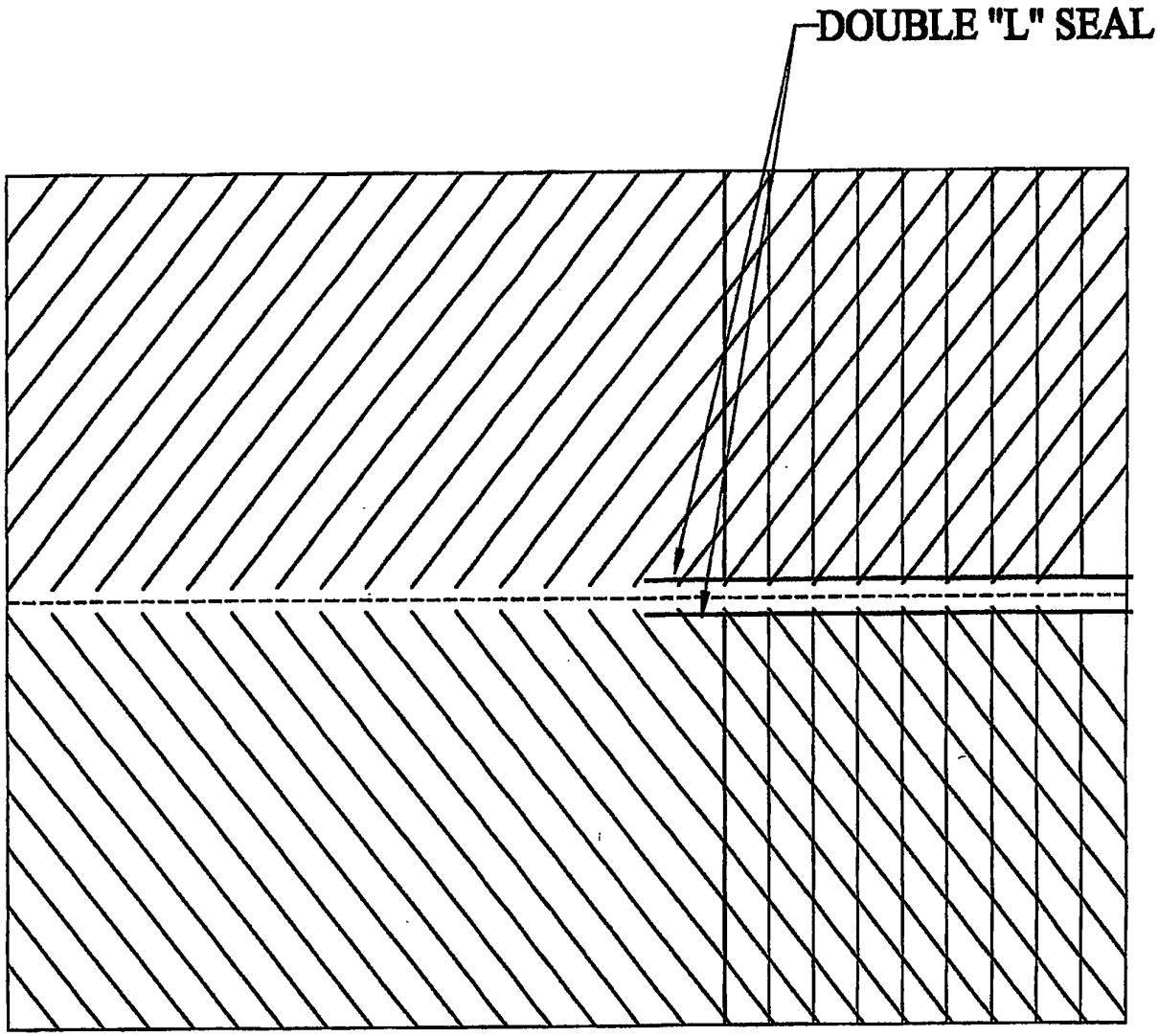


FIG:H3

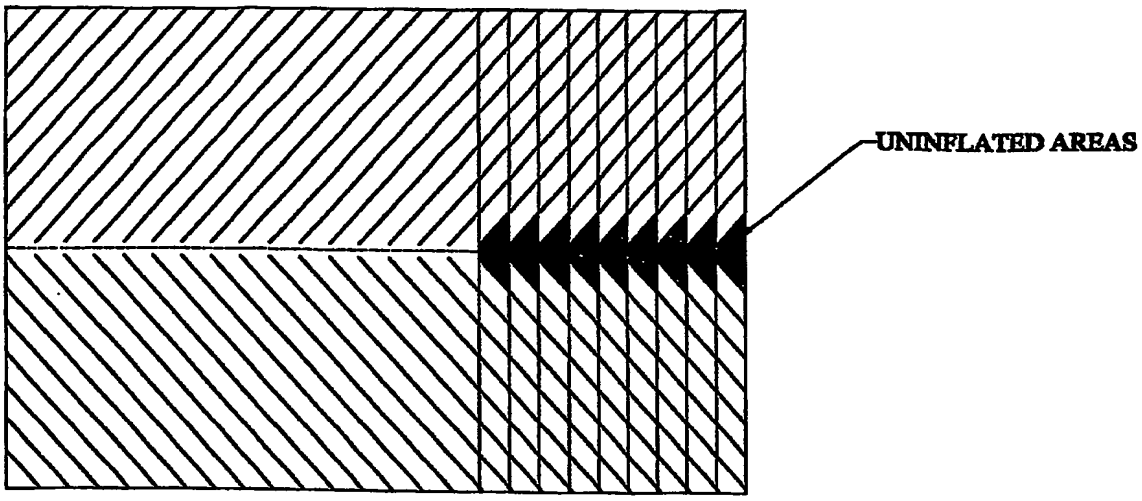


FIG:H1

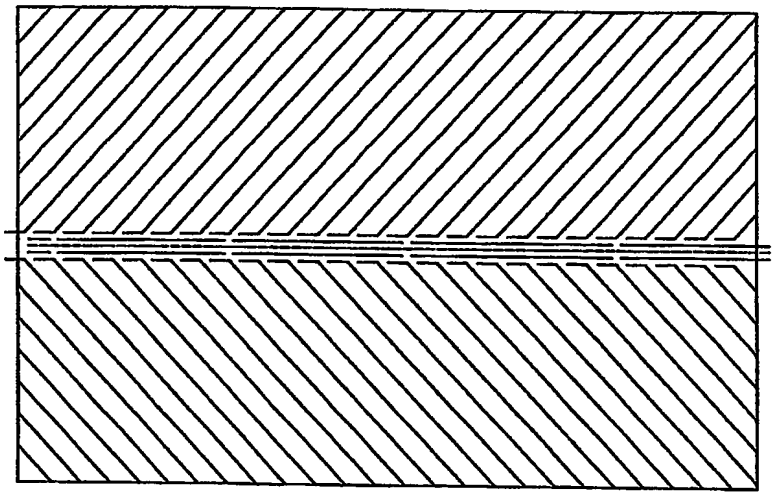
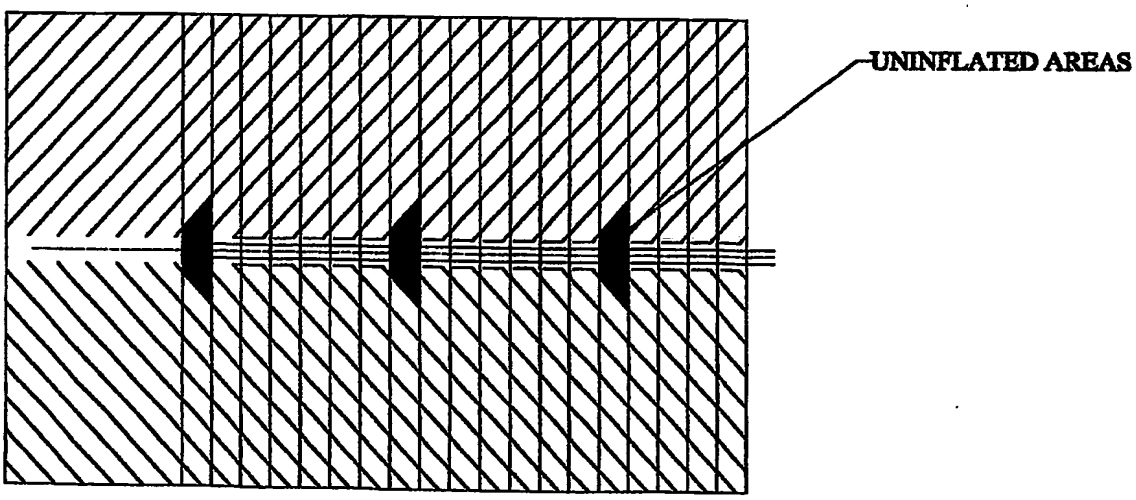


FIG:H2



Declaration:

6/3/2002

I am an individual and not a corporation

Hasdi Matarasso

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